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(54) Title: REPRESENTATION OF APPLICATIONS IN A TELECOMMUNICATION SYSTEM
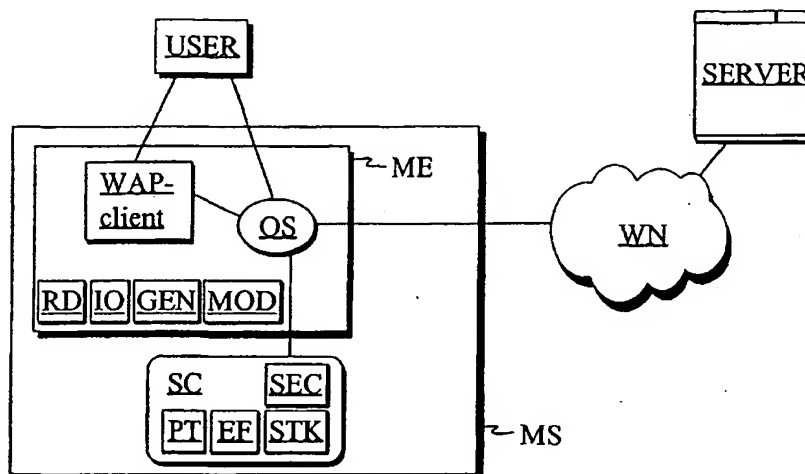
(57) Abstract: A method for the using and representation of applications stored on a terminal device and/or smart card in a telecommunication system comprising a telecommunication network (WN); a terminal device (MS) which is connected to the telecommunication network (WN) a server (SERVER) which is connected to the telecommunication network (WN); a smart card (SC) which has been inserted into the terminal device (MS); a SIM Application Toolkit (STK) which has been arranged in the terminal device (MS) and/or smart card (SC). In the method, the terminal device (MS) comprises the necessary features for using the WAP. According to the invention, a piece of definition information (EF) is generated that comprises information about the SIM Application Toolkit applications at the disposal of the terminal device (MS) and about their use in a WAP environment; definition information (EF) is being read, when one wishes to use SIM Application Toolkit applications in a WAP environment; and SIM Application Toolkit applications are being displayed on the terminal device (MS) in a WAP environment in a way as presented by the piece of definition information (EF).

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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REPRESENTATION OF APPLICATIONS IN A TELECOMMUNICATION SYSTEM

FIELD OF THE INVENTION

The present invention relates to telecommunication systems. In particular, the invention relates to a method and a system for the using and representation of applications stored on a smart card in a telecommunication system comprising a telecommunication network; a terminal device which is connected to the telecommunication network; a server which is connected to the telecommunication network; a smart card which has been inserted into the terminal device; a SIM Application Toolkit which has been arranged in the terminal device and/or the smart card. In the telecommunication system, the terminal device comprises the necessary features for using the WAP (WAP, Wireless application Protocol).

BACKGROUND OF THE INVENTION

The use of the wireless application protocol is becoming common in solutions in which a connection is needed between portable terminal devices, such as mobile stations and the Internet applications, e.g. electronic mail, WWW (World Wide Web), news groups. The wireless application protocol provides an architecture which adapts mobile phones, browser programs of mobile phones, and the WWW to work as a functional entity. The HTML language (Hyper Text Mark-up Language) used in the WWW is translated into a WML (Wireless Mark-up Language) designed for the wireless environment, when information is being transmitted to mobile stations. At present, as the description language of the WAP standard, the WML language is used, but the language may be understood to mean also any other description language consistent with the future WAP standard. The wireless application protocol com-

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prises of the following five layers: wireless applica-
tion environment (WAE, Wireless Application Environ-
ment), wireless session layer (WSL, Wireless Session
Layer), wireless transaction layer (WTP, Wireless
5   Transaction Layer), wireless transport layer security
(WTLS, Wireless Transport Layer Security), and wire-
less datagram layer (WDP, Wireless Datagram Layer).
The wireless application environment is used to mean,
e.g. a WTA (WTA, Wireless Telephone Application), or
10   some other suitable environment. Lowermost is yet a
system dependant layer which defines the transfer mode
of the information inside the system in question. The
specification accepted at the moment is the WAP speci-
fication 1.1. The aforementioned specification and
15   other WAP related specifications are available at the
Internet address www.wapforum.com.

Ericsson, Motorola, Nokia and Phone.com
founded in 1997 the WAP Forum. The WAP Forum is among
other things an open association of terminal manufac-
20   tures, operators and different service providers,
which anyone can join. One specific objective of the
WAP architecture is to enable the use of services pro-
vided by the Internet on terminals whose data process-
ing capacity, size of display or storage capacity is
25   small or restricted. Terminals as described above are,
e.g. mobile stations and PDAs (PDA, Personal Digital
Assistant).

The undeniable advantage of a mobile communi-
cation network, e.g. a GSM system (GSM, Global System
30   for Mobile communications) as compared with a public
switched telephone network (PSTN, Public Switched
Telephone Network) is the mobility management. The mo-
bile communication network enables one to make and re-
ceive phone calls anywhere in the coverage area of the
35   network. In this application, a mobile communication
network is advantageously used to mean a digital mo-
bile network.

The substantial part of the function of the terminal devices of mobile communication networks, the mobile stations, is the subscribe identity module (SIM, Subscriber Identity Module). When you separate

5   the actual terminal device and the subscriber identity module individualizing the subscriber from one another, a system is established in which specific operators may offer different services to the users of the mobile stations. The operator is herein used to

10 mean an entity which has got the infrastructure of the mobile communication network at his or her disposal in order to provide mobile communication services. The separating of the mobile station and the subscriber identity module from one another enables a constant

15 development of services connected with the mobile stations and the introduction of new, operator-specific services. The functional interface between the mobile station and the subscriber identity module has been described in the specification TS 100 977 V7.3.0

20 (1999-07) of ETSI. (ETSI, European Telecommunications and Standard Institute).

The step of development connected with the function of the subscriber identity module is the definition of the SIM Application Toolkit which de-

25 fines specifications to the interface between the mobile station and the subscriber identity module. The SIM Application Toolkit is used to mean all those functions and mechanisms that enable the interaction of the applications on the subscriber identity module

30 with the mobile station. This requires that the mobile station supports the functions and mechanisms needed in the interaction. The SIM application Toolkit has been defined in the specification TS 101 267 V7.3.1 (1999-07) of ETSI.

35 The problem is the combining of the SIM Application Tolkit and the wireless application protocol in such a way that the WAP application need not know

beforehand what kind of SIM Application Toolkit appli-
cations there are on the subscriber identity module.
Furthermore, the problem is the fact of how the user
interface of the SIM Application Toolkit is manifested
5   in the WAP.

OBJECTIVE OF THE INVENTION

The objective of the invention is to elimi-
nate the drawbacks referred to above, or at least sig-
10   nificantly to alleviate them. One specific objective
of the invention is to disclose a method and a system
which enables one to easily change the representation
mode of the user interface or the structure of the ap-
plications, when SIM Application Toolkit is being used
15   in the WAP. Moreover, thanks to the invention, the co-
operation of the SIM Application Toolkit and the WAP
may be easily implemented.

As for the features characteristic of the in-
vention, reference is made to them in the claims.
20

BRIEF DESCRIPTION OF THE INVENTION

The invention relates to the using and repre-
sentation of applications stored on a smart card in a
telecommunication system. One specific objective of
25   the invention is to enable the co-operation of the SIM
Application Toolkit applications and the WAP in such a
way that the SIM Application Toolkit and its services
may be used and displayed in the WAP without the WAP
application having to know beforehand what kind of SIM
30   Application Toolkit applications there are on the
smart card.

The telecommunication system of the invention
comprises a telecommunication network, a terminal de-
vice which is connected to the telecommunication net-
35   work, a server which is connected to the telecommuni-
cation network, a smart card which has been inserted

into the terminal device, a SIM Application Toolkit
which has been arranged in the terminal device and/or
the smart card. In the method, the terminal device
comprises the necessary features for using the WAP.

5   This means, e.g. that the terminal device comprises a
WAP client program and that the terminal device is ca-
pable of displaying functions connected with the WAP
client program.

According to the invention, a piece of defi-
10   nition information is created that contains informa-
tion about the SIM Application Toolkit applications
and about their use in a WAP environment. Definition
information is read, when one wishes to use SIM Appli-
cation Toolkit applications in a WAP environment. SIM
15   Application Toolkit applications are being displayed
on the terminal device in a WAP environment in a way
as defined by the piece of definition information. The
piece of definition information may be created, e.g.
on the terminal device and/or the smart card. The
20   piece of definition information may be used to define,
e.g. the fact of how SIM Application Toolkit applica-
tions are being displayed on the terminal device. The
exterior features of the user interface may depend,
e.g. on the size of the display of the terminal de-
25   vice.

In one embodiment of the invention, the piece
of definition information is created on a server which
is connected to the telecommunication network. On the
terminal device and/or smart card there is, e.g. a
30   pointer stored that refers to the piece of definition
information located on the server. The pointer is,
e.g. a URL address (URL, Universal Resource Locator).
Based on the pointer, the piece of definition informa-
tion may be retrieved from the server by way of the
35   telecommunication network. In addition, the piece of
definition information may be authenticated by means
of the digital signature. Because of this, one can be

sure of the fact that the content of the piece of
definition information has not been changed.

In another embodiment of the invention, it is
possible to edit the piece of definition information
by means of the terminal device. Because of the possi-
bility of editing, the representation mode of the user
interface and/or the structure of the applications can
be changed in real-time.

The system of the invention comprises a piece
of definition information which comprises information
about the SIM Application Toolkit applications at the
disposal of the terminal device and about their use in
a WAP environment, an information reader which is used
to read definition information, when one wishes to use
SIM Application Toolkit applications in a WAP environ-
ment, and a generator which is used to display SIM Ap-
plication Toolkit applications on the terminal device
in a WAP environment in a way as defined by the piece
of definition information.

In one embodiment, the piece of definition
information has been arranged in the terminal device
and/or smart card. In another embodiment, the piece of
definition information has been arranged in the
server, and in addition, the terminal device and/or
smart card may comprise a pointer which refers to the
piece of definition information located on the server.
Further, the terminal device and/or smart card may
comprise an information retrieval entity for retriev-
ing the piece of definition information

In an embodiment of the invention, the termi-
nal device and/or smart card comprises a modifier for
modifying the piece of definition information.

In an embodiment of the invention, the termi-
nal device/and or smart card comprises a certification
entity which is used to make sure of the reliability
and origin of the piece of definition information. The
certification entity enables one to find out, e.g.

whether the possible digital signature connected with the piece of definition information is authentic.

In an embodiment of the invention, the smart card is a subscriber identity module. The subscriber

5   identity module may comprise a WIM (WIM, WAP Identity Module) by means of which it is possible to implement measures required by the WAP protocol.

In an embodiment of the invention, the smart card comprises a WIM. In an embodiment, the piece of

10   definition information is part of WIM.

In an embodiment of the invention, the terminal device is a mobile station. In an embodiment of the invention, the telecommunication network is a mobile communication network.

15   Thanks to the present invention, it is possible to use in WAP the SIM Application Toolkit and the services provided by it without the WAP application having to know beforehand what kind of applications there are on the smart card, which is preferably a

20   subscriber identity module. Thanks to the invention, the user interface connected with the SIM Application Toolkit applications looks like a normal WML site.

BRIEF DESCRIPTION OF THE DRAWINGS

25   In the following section, the invention will be described in detail by the aid of a few examples of its embodiments with reference to the accompanying drawing, in which

Fig. 1 represents one advantageous embodiment

30   in accordance with the invention

Fig. 2 is a flow chart illustrating the function of the present invention; and

Fig. 3 is a signaling diagram illustrating the function of the present invention.

35

DETAILED DESCRIPTION OF THE INVENTION

The system as described in Fig. 1 comprises a terminal device MS, a telecommunication network WN and a server SERVER. The terminal device MS and the server SERVER communicate with the telecommunication network

5   WN. The terminal device MS is preferably a mobile station and the telecommunication network a mobile communication network. The system as shown in Fig. 1 comprises, in addition, a user USER, under whose control and at whose disposal the mobile station MS is. In

10   this example, the mobile station MS consists of the mobile station equipment itself and a smart card SC. The mobile station MS may, in addition, comprise many other parts, components or features which are not necessary to present in this connection and which are ob-

15   vious to a man skilled in the art.

The smart card is preferably a subscriber identity module SIM. If the smart card SC is a subscriber identity module, it may also comprise a WIM. In such a situation, the SIM functionality connected

20   with the mobile communication network WN and the WIM functionality may use different logical channels. WIM is used to mean a protected device or instrument which is used to perform different measures and saves of WAP connected with the security. WIM may be used to per-

25   form, e.g. security measures connected with the WTLS and application level. In particular, WIM may be used to save and process information that is needed in identification and authentication. The smart card SC may also be merely a WIM card.

30   In the example as shown in Fig 1, the smart card SC comprises a SIM Application Toolkit STK. The SIM Application Toolkit STK is used to mean all those functions and mechanisms that enable the interaction of the applications on the subscriber identity module

35   with the mobile station. On the smart card SC there is also a piece of definition information EF arranged that comprises information about the SIM Application

Toolkit applications at the disposal of the mobile station MS and about their use in a WAP environment. The piece of definition information EF may also be generated on the server SERVER. This implementation mode requires, however, that the security factors are carefully considered. In this situation, the data transfer may have to be encrypted and one has to take care of the identification of parties. The smart card SC comprises a pointer PT which refers to the piece of definition information located in the server SERVER. Thanks to the pointer PT, the piece of definition information EF included in the server SERVER may be retrieved by way of the telecommunication network WN. The smart card SC may, in addition, comprise a certification entity which enables one to make sure of the reliability and origin of the piece of definition information.

The mobile station equipment as shown by Fig. 1 comprises an operating system OS, a WAP client program WAP client, an information reader RD, an information retrieval entity IO, a generator GEN and a modifier MOD. The operating system OS communicates with the user USER, WAP client program WAPclient and smart card SC. The information reader is used to read the definition information EF in a situation where one wishes to use SIM Application Toolkit applications in a WAP environment. The information retrieval entity IO may be used to retrieve the piece of definition information on the server SERVER in a situation where the piece of definition information EF has not been saved to the mobile station MS. The generator GEN is used to display SIM Application Toolkit applications on the terminal device MS in a WAP environment in a way as defined by the piece of definition information EF.

Fig. 2 represents a flow chart illustrating the function of the present invention. As shown in block 20, a piece of definition information is gener-

ated that comprises information about the SIM Applica-
tion Toolkit applications at the disposal of the mo-
bile station and about their use in a WAP environment.
The terminal device comprises the necessary means and
5   equipment for reading the piece of definition informa-
tion. As shown in block 21, the piece of definition
information is read, when one wishes to use SIM Appli-
cation Toolkit applications in a WAP environment. As
shown in the present invention, the piece of defini-
10 tion information may be located either in the terminal
device or in a server connected to the telecommunica-
tion network, blocks 23 and 24.

    When the piece of definition information has
been retrieved from an appropriate place, SIM Applica-
15 tion Toolkit applications are being displayed in a WAP
environment on the terminal device as shown by the
piece of definition information, block 25.

    Fig. 3 represents one example of a signaling
diagram illustrating the function of the present in-
20 vention. The example as shown in Fig 3 comprises a
user USER, a wireless environment WAE, a mobile sta-
tion ME and a subscriber identity module SIM inserted
into the mobile station.

    The user USER shows his or her wish to util-
25 ize some SIM Application Toolkit applications in a WAP
environment by a certain key command, arrow 30. The
command given by the user USER is transmitted to the
WAE environment WAE, arrow 31. The PROCESSING box 32
means that at this point in the WAE environment WAE,
30 it is found out what the received service request
means and how one has to react to it. The WAE environ-
ment WAE sends a service request via the mobile sta-
tion ME to the subscriber identity module SIM, arrows
33 and 34. By means of the service request one tries
35 to find out how the SIM Application Toolkit applica-
tions are being presented in a WAE environment WAE,
e.g. in a WML language. To the subscriber identity

module, it is possible to save a specific piece of definition information which comprises information about the SIM Application Toolkit applications at the disposal of the terminal device ME and about their use

5   in a WAE environment WAE.

The subscriber identity module returns a response to the presented service request, arrows 35 and 36. The PROCESSING box 37 describes the fact that the form and meaning of the response returned by the sub-

10 scriber identity module SIM is being interpreted. As shown by arrows 38 and 39, the SIM Application Toolkit application is presented to the user USER by a description language suitable for the purpose, e.g. a WML language.

15 In an embodiment of the invention, the piece of definition information may comprise following descriptions:

```
<INFO> ::= <general><type><command-info>
<general> ::= [<strong>][<emphasize>][<underline>][<small>][<big>]
<type> ::= menu | (other commands defined in TS 101 267)
<command-info> ::= <number-of-items>(<item-id-number>
                        <alpha-identifier><presentation-info>)*
<presentation-info> ::= [<strong>][<emphasize>][<underline>]
                        [<small>][<big>] | <default> |  <general> | TBD
<default> ::= (WAE default values)
```

The first line describes the fact of what elements the <INFO> field consists of. It consists of

30 the field <general>, <type> and <command-info>. The <INFO>-field always comprises the three aforementioned fields. The <General>-field may comprise following definitions: <strong>, <emphasize>, <underline>, <small> and <big>. The brackets on the line mean that any combina-

35 tions of the aforementioned fields are possible. In other words, each field may appear alone or as a combination with others. The Type> -field comprises the

message to be transmitted or the type of the command. One example of this is the <menu>-type. Other possible types are defined in the specification TS 101 267 of ETSI.

5   The <Command-info> field consists of the field <number-of-items>. At the end of it may be an undetermined number of field combination <item-id-number><alpha-identifier><presentation-info>. The <Presentation-info> field may comprise the same information as the <general> field. 10   Alternatively, it may comprise the <default>-field or tai TBD. The value of the <Default>-field may be one of the initial values of WAE.

The invention is not restricted merely to the examples of its embodiments referred to above, instead 15   many variations are possible within the scope of the inventive idea defined by the claims.

CLAIMS

1. A method for the using and representation of applications stored on a terminal device and/or smart card in a telecommunication system comprising:

5   a telecommunication network (WN);

a terminal device (MS) which is connected to the telecommunication network;

a server (SERVER) which is connected to the tele-communication network (WN);

10   a smart card (SC) which has been inserted into the terminal device (MS);

a SIM Application Toolkit (STK) which has been arranged in the terminal device (MS) and/or smart card (SC);

15   in which method the terminal device (MS) comprises the necessary features for using the WAP,

c h a r a c t e r i s e d   in that the method comprises the steps of:

generating a piece of definition information (EF)
20 which comprises information about the SIM Application Toolkit applications at the disposal of the terminal device (MS) and about their use in a WAP environment;

reading definition information (EF), when one wishes to use SIM Application Toolkit applications in
25 a WAP environment;

displaying SIM Application Toolkit applications on a terminal device (MS) in a WAP environment in a way as presented by the piece of definition information (EF).

30   2. A method as defined in claim 1, c h a r - a c t e r i s e d   in that a piece of definition infor-mation (EF) is generated on the terminal device (MS) and/or smart card (SC).

3. A method as defined in claim 1, c h a r -
35 a c t e r i s e d   in that the method comprises the steps of:

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generating a piece of definition information (EF) on the server (SERVER);

storing on the terminal device (MS) and/or smart card (SC) a pointer which refers to the piece of defi-

5   nition information (EF) located on the server (SERVER); and

retrieving the piece of definition information (EF) by way of the telecommunication network (WN).

4. A method as defined in any one of the pre-

10   ceding claims 1, 2 or 3, c h a r a c t e r i s e d   in that the piece of definition information (EF) is being edited on the terminal device (MS).

5. A method as defined in any one of the pre-ceding claims 1, 2, 3 or 4, c h a r a c t e r i s e d   in

15   that one makes sure of the reliability and origin of the piece of definition information (EF).

6. A method as defined in any one of the pre-ceding claims 1, 2, 3, 4 or 5, c h a r a c t e r i s e d in that the smart card (SC) is a subscriber identity

20   module.

7. A method as defined in any one of the pre-ceding claims 1, 2, 3, 4 or 5, c h a r a c t e r i s e d in that the smart card (SC) is a subscriber identity module that comprises a WIM.

25   8. A method as defined in any one of the pre-ceding claims 1, 2, 3, 4 or 5, c h a r a c t e r i s e d in that the smart card (SC) is a WIM card.

9. A method as defined in any one of the pre-ceding claims 1, 2, 3, 4, 5, 6, 7 or 8, c h a r a c -

30   t e r i s e d   in that the piece of definition informa-tion (EF) is part of WIM.

10. A method as defined in any one of the preceding claims 1, 2, 3, 4, 5, 6, 7, 8 or 9, c h a r -a c t e r i s e d   in that the terminal device (MS) is a

35   mobile station.

11. A method as defined in any one of the preceding claims 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10,

c h a r a c t e r i s e d　in that the telecommunication network (WN) is a mobile communication network.

12. A system for the using and representation of applications stored on a terminal device and/or
5　smart card in a telecommunication system comprising:

a telecommunication network (WN);

a terminal device (MS) which is connected to the telecommunication network;

a server (SERVER) which is connected to the tele-
10　communication network (WN);

a smart card (SC) which has been inserted into the terminal device (MS);

a SIM Application Toolkit (STK) which has been ar- ranged in the terminal device (MS) and/or smart card
15　(SC);

in which system the terminal device (MS) comprises the necessary features for using the WAP,

c h a r a c t e r i s e d　in that the method comprises:
20　a piece of definition information (EF) which com- prises information about the SIM Application Toolkit applications at the disposal of the terminal device (MS) and about their use in a WAP environment;

an information reader (RD) which is used to read
25　definition information (EF), when one wishes to use SIM Application Toolkit applications in a WAP environ- ment; and

a generator (GEN) which is used to display SIM Ap- plication Toolkit applications on a terminal device
30　(MS) in a WAP environment in a way as presented by the piece of definition information (EF).

13. A system as defined in claim 12, c h a r - a c t e r i s e d　in that the piece of definition in- formation (EF) has been arranged in the terminal de-
35　vice (MS) and/or smart card (SC).

14. A system as defined in claim 12 or 13, c h a r a c t e r i s e d　in that

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the piece of definition information (EF) has been
arranged in the server (SERVER);
    the terminal device (MS) and/or smart card (SC)
comprises a pointer (PT) which refers to the piece of
5   definition information (EF) located on the server
(SERVER); and
    the terminal device (MS) and/or smart card (SC)
comprise an information retrieval entity (IO) for re-
trieving the piece of definition information (EF) by
10 way of the telecommunication network (WN).

    15. A system as defined in any one of the
preceding claims 12, 13 or 14, c h a r a c t e r i s e d
in that the terminal device (MS) and/or smart card (SC)
comprises a modifier (MOD) for modifying the piece of
15 definition information (EF).

    16. A system as defined in any one of the
preceding claims 12, 13, 14 or 15, c h a r a c t e r -
i s e d in that the terminal device (MS) and/or smart
card (SC) comprises a certification entity (SEC) which
20 is used to make sure of the reliability and origin of
the piece of definition information (EF).

    17. A system as defined in any one of the
preceding claims 12, 13, 14, 15 or 16, c h a r a c -
t e r i s e d in that the smart card (SC) is a sub-
25 scriber identity module.

    18. A system as defined in any one of the
preceding claims 12, 13, 14, 15 or 16, c h a r a c -
t e r i s e d in that the smart card (SC) is a sub-
scriber identity module which comprises a WIM.

30   19. A system as defined in any one of the
preceding claims 12, 13, 14, 15 or 16, c h a r a c -
t e r i s e d in that the smart card (SC) is a WIM
card.

    20. A system as defined in any one of the
35 preceding claims 12, 13, 14, 15, 16, 17, 18 or 19,
c h a r a c t e r i s e d in that the terminal device
(MS) is a mobile station.

17

21. A system as defined in any one of the preceding claims 12, 13, 14, 15, 16, 17, 18, 19 or 20, c h a r a c t e r i s e d in that the telecommunication network (WN) is a mobile communication network.
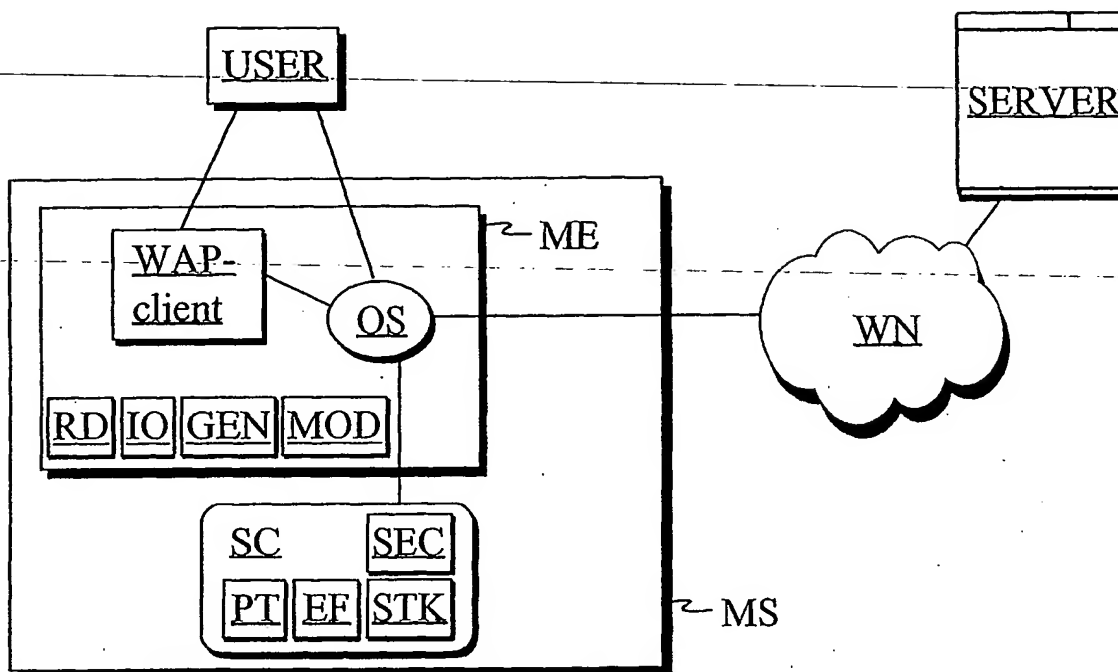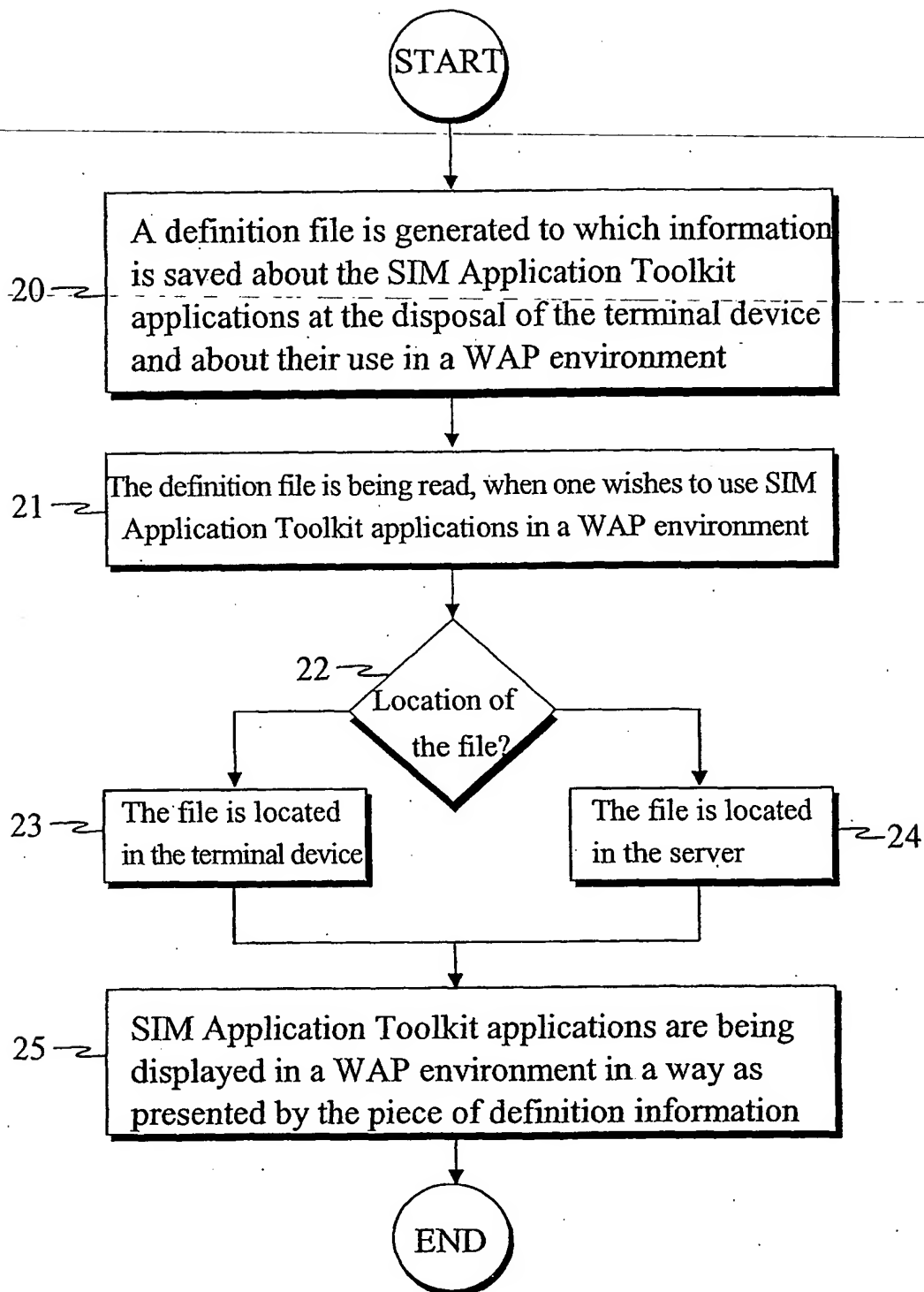
5

Fig. 1

START

20 — A definition file is generated to which information is saved about the SIM Application Toolkit applications at the disposal of the terminal device and about their use in a WAP environment

21 — The definition file is being read, when one wishes to use SIM Application Toolkit applications in a WAP environment

22 — Location of the file?

23 — The file is located in the terminal device

The file is located in the server — 24

25 — SIM Application Toolkit applications are being displayed in a WAP environment in a way as presented by the piece of definition information

END

Fig. 2
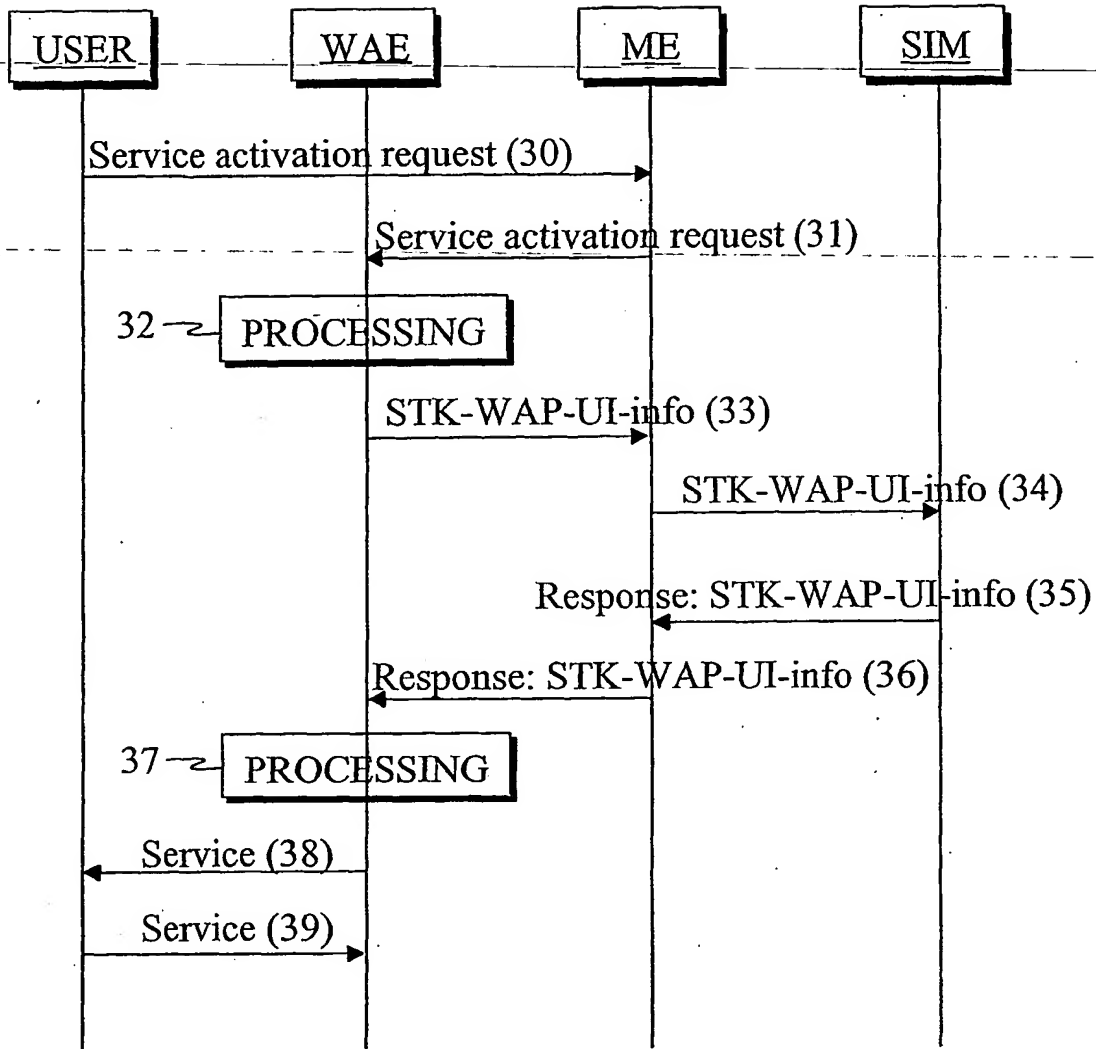
Fig. 3

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04Q 7/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9963767 A2 (TELIA AB), 9 December 1999 (09.12.99), page 2, line 10 - page 4, line 33, abstract	1-21
A	EP 0869691 A2 (DEUTSCHE TELEKOM AG), 7 October 1998 (07.10.98), see whole document	1-21
P,A	WO 0072545 A1 (NOKIA CORPORATION), 30 November 2000 (30.11.00), page 1, line 1 - page 4, line 18	1-21

☐ Further documents are listed in the continuation of Box C.   ☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 May 2001	0.5 -06- 2001

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Form PCT/ISA/210 (second sheet) (July 1998)

International application No.
PCT/FI 01/00028

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WO	9963767	A2	09/12/99	AU	1182699	A	24/05/99
				BR	9813184	A	22/08/00
				EP	1028615	A	23/08/00
				EP	1082865	A	14/03/01
				NO	20006102	A	26/01/01
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				SE	9802004	A	06/12/99
EP	0869691	A2	07/10/98	DE	19713965	A	08/10/98
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				FI	991179	A	25/11/00